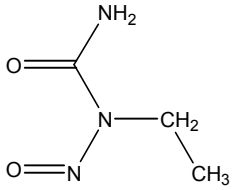
N-NITROSO-*N*-ETHYLUREA
CAS No. 759-73-9
First Listed in the *Second Annual Report on Carcinogens*



CARCINOGENICITY

N-Nitroso-*N*-ethylurea is *reasonably anticipated to be a human carcinogen* based on sufficient evidence of carcinogenicity in experimental animals (IARC V.1, 1972; IARC V.17, 1978; IARC S.4, 1982; IARC S.7, 1987). When administered orally, the chemical induced malignant neurogenic tumors in the brain, spinal cord, and peripheral nervous system in rats and neoplasms of the eye, liver, brain, kidney, muscle, and jaw of opossums. When administered in the drinking water, *N*-nitroso-*N*-ethylurea induced stomach papillomas, sarcomas, and sarcomas of the large intestine in male rats and adenocarcinomas of the mammary gland and leukemias in rats of both sexes.

When administered by subcutaneous injection, *N*-nitroso-*N*-ethylurea induced hepatomas, hepatocellular carcinomas, lung adenomas, and adenocarcinomas, lymphomas, and tumors of the peripheral nervous system, spinal cord, and brain in rats. When administered by intraperitoneal injection, the compound induced intracranial neurogenic and renal epithelial neoplasms and malignant tumors of the liver, kidney, ovary, lung, harderian gland, stomach, and lymphoreticular system in mice and thymic lymphomas and myeloid leukemia in rats. When administered intravenously, *N*-nitroso-*N*-ethylurea induced leukemia, gliomas of the brain, and malignant tumors of the uterus and vagina in rats and malignant tumors of the ovary, uterus, vascular endothelium, bone, bone marrow, and skin in monkeys. Prenatal exposure by intraperitoneal injection of *N*-nitroso-*N*-ethylurea induced pulmonary adenomas, tumors of endocrine glands, and tumors of the central and peripheral nervous systems in the offspring of mice. Prenatal exposure by intravenous injection of the compound induced malignant neurogenic tumors and neuroectodermal tumors in the offspring of rats, tumors of the nervous system in the offspring of hamsters, kidney adenomas, adenocarcinomas, and adenocarcinosarcomas in the offspring of rabbits, adenomas of the sweat glands and papillomas of the skin in the offspring of pigs. Prenatal exposure by oral administration of *N*-nitroso-*N*-ethylurea induced tumors of the brain, spinal cord, and trigeminal nerve in the offspring of rats (IARC V.17, 1978).

There are no data available to evaluate the carcinogenicity of *N*-nitroso-*N*-ethylurea in humans.

PROPERTIES

N-Nitroso-*N*-ethylurea is a yellow to pink crystalline solid. It is soluble in water and in polar organic solvents and insoluble in nonpolar organic solvents. Its stability in aqueous solutions is pH dependent (pH 4.0, half-life 190 hours; pH 6.0, half-life 31 hours; pH 7.0, half-life 1.5 hours; pH 8.0, half-life 0.1 hours; pH 9.0, half-life 0.05 hours, at 20^{o}C). In alkaline

solutions it decomposes to diazoethane. When heated to decomposition, it emits toxic fumes of nitrogen oxides (NO_x).

USE

N-Nitroso-*N*-ethylurea has been used to synthesize diazoethane in the laboratory. It is used as a mutagen and ethylating agent. Its mutagenic effect has been studied for promoting the growth of various plants. No commercial use has been found (IARC V.17, 1978).

PRODUCTION

The Chem Sources USA directory identified one producer of an unspecified volume and three suppliers of *N*-nitroso-*N*-ethylurea in 1986 (Chem Sources, 1986). No other current production data were available. The 1979 TSCA Inventory identified one domestic company that produced about 500 lb of this chemical in 1977 (TSCA, 1979). No data on imports or exports were available.

EXPOSURE

The primary route of potential human exposure to *N*-nitroso-*N*-ethylurea is by dermal contact and inhalation. This potential exposure could occur during use of the chemical by laboratory personnel or during its production at a single site. Data on the numbers of people potentially exposed are not available. It hydrolyzes in water with a half-life of 1.5 hours (at pH=7, 20^{o}C).

REGULATIONS

EPA regulates *N*-nitroso-*N*-ethylurea under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), Resource Conservation and Recovery Act (RCRA), and Superfund Amendments and Reauthorization Act (SARA). EPA has established a final RQ of 1 lb. *N*-Nitroso-*N*-ethylurea is subject to reporting/recordkeeping requirements under RCRA and SARA. OSHA regulates *N*-nitroso-*N*-ethylurea under the Hazard Communication Standard and as a chemical hazard in laboratories. Regulations are summarized in Volume II, Table B-104.